

REMARKS

Favorable reconsideration of this application in view of the remarks to follow is respectfully requested.

In response to Examiner's comments and for the purpose of advancing prosecution of the present application, applicants have amended Claims 1 and 57. Claim 1 has been amended to recite that the precursor compound is *a precursor metal atom* bound to a ligand. Claim 1 has also been amended to recite the *proviso that the precursor compound is not an alkylamine alane, MeAu(PMe₃), or (Me₃P)Cu(tertbutoxy), and the proviso that the precursor metal atom is not Pt*. Claim 57 has been amended to delete the following compounds from the scope of Claim 1: Me₂AlH(NEtMe₂); (EtMe₂N)AlH₃; (Et₃N)AlH₃; trimethylamine, diethylmethylanine, dimethylethylanine, triethylanine; tetrakis(dimethylanino), tetrakis(diethylanino) Ti, Zr, Hf, Si, Ge, Sn, Pb; tris(dimethylanino) phosphine; tris(dimethylanino) antimony; tris(dimethylanino) arsine; tris(dimethylanino) stibine; bis(dimethylanino)(trimethylethylethylenediamino) aluminium; pentadimethylaminotantalum; diethylaminodimethyltin; hexadimethylaminoditungsten; trisdimethylamino(trimethylethylethylenediamino)titanium; {(Me₃Si)₂N}₃ B, Al, Ga, In; {(Me₃Si)₂N}₂ Zn, Cd, Hg.

Claims 1-2, 14-22 and 24-57 stand rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, it is the Examiner's position that, "the specification gives numerous examples where a precursor metal atom is bound to a ligand, but none show a precursor compound per se that is bound to a ligand of the type called for in the claim". Applicants have amended Claim 1 to recite that the "*precursor compound is a precursor metal atom bound to a ligand*". Support for this amendment is

found throughout the present specification; i.e., Page 21 paragraph 1, Page 23 paragraph 2, Page 25 paragraph 2, Page 26 paragraph 2. Applicants submit that the §112 rejection has been obviated in light of amended Claim 1.

In the present Office Action, Claims 1-2 and 57 stand rejected, under 35 U.S.C. §102(b), as allegedly anticipated by U.S. Patent No. 5,861,189 to Sheel, et al. (“Sheel, et al.”). Claims 1-2, and 57 stand rejected under 35 U.S.C. §102(b) as being allegedly anticipated by U.S. Patent No. 5,783,716 to Baum, et al. (“Baum, et al.”). Claims 1-2, 14-22 and 24 stand rejected under 35 U.S.C. §§102(a), 102(e) as being allegedly anticipated by U.S. Patent No. 6,214,105 to Hintermaier, et al. (“Hintermaier, et al.”). Applicants traverse the above rejections and submit the following.

It is axiomatic that anticipation under §102 requires the prior art reference to disclose every element to which it is applied. *In re King*, 801 F.2d 1324, 1326, 231 USPQ 36, 138 (Fed Cir, 1986). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: absence from the applied reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Turning to the §102(b) rejections of Claims 1-2, and 57, it is the Examiner’s position that Sheel, et al. disclose a “pyrolytic deposition of aluminum using a dimethylethylamine alane in a dimethylethylamine solvent.” Sheel, et al. disclose a method of producing mirrors by depositing a reflecting metal layer by pyrolysis on a ribbon of hot glass, where the metal layer is deposited using an aluminum precursor such as alane adduct having a composition

$\text{AlH}_3[\text{N}(\text{CH}_3)_2\text{C}_2\text{H}_5]_{4.6}$. Amended Claim 1 does not include alkylamine alane precursor compounds or any precursor compounds with precursor metal atoms bound to amine ligands. Therefore, Sheel, et al. do not disclose every element of the claimed invention as recited in amended Claim 1. Sheel, et al. do not anticipate amended Claim 1.

Referring to the §102(b) rejection of Claims 1-2, and 57, citing Baum, et al., it is the Examiner's position that Baum, et al. disclose "two precursor compounds having carbonyl ligands $\text{Pt}(\text{CO})_2\text{Cl}_2$ and $(\text{C}_2\text{H}_5)\text{Pt}(\text{CH}_3)(\text{CO})$, a precursor compound having a phosphido ligand, $\text{Pt}(\text{PF}_3)_4$, and a precursor compound having a silyl ligand, the cyclopentadienyl trialkyl platinum compound with either trimethylsilyl or trimethylsilyl methyl R groups shown at column 3 lines 24-45" and therefore anticipates amended Claim 1. Applicants have amended Claim 1 to remove Pt-containing precursor compounds. Therefore in light of applicants' amendment to Claim 1, Baum, et al. do not disclose the use of one of applicants' claimed precursors. Applicants respectfully submit that Baum, et al. do not anticipate amended Claim 1.

Now referring to the anticipation rejections of Claims 1-2, 14-22 and 24 citing Hintermaier, et al., it is the Examiner's position that Hintermaier, et al. teach alkane and polyamine solvent compositions for liquid delivery chemical vapor deposition. Hintermaier, et al., referring to Column 3 lines 50-60, disclose two precursor compounds having phosphido ligands, $\text{MeAu}(\text{PMe}_3)$ and $(\text{Me}_3\text{P})\text{CuOtBu}$. Hintermaier, et al. further disclose a precursor composition consisting of a solvent medium having dissolved therein one or more metal organic compounds selected from β -diketonate, alkoxide, alkyl, and/or aryl groups. Applicants are not claiming any of the above-mentioned metal organic compounds, nor a precursor composition including these compounds. Additionally, applicants have amended

Claim 1 to add the proviso that *that the precursor compound is not an alkylamine alane, MeAu(PMe₃), or (Me₃P)Cu(tertbutoxy)*. Therefore, since Hintermaier, et al. fail to teach every aspect of amended Claim 1, Hintermaier, et al. do not anticipate Claim 1.

The forgoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention as required by *King and Kloster Speedsteel; et. al.*, therefore the claims of the present application are not anticipated by the disclosures of Sheel, et al., Baum, et al., and Hintermaier, et al. Applicants respectfully submit that the instant §102 rejections have been obviated and withdrawal thereof is respectfully requested.

Claims 25-43 and 47 are rejected under 35 U.S.C. §103(a) as allegedly obvious over Hintermaier, et al. in view of U.S. Patent No. 5,897,459 to Gadgil, et al. (“Gadgil, et al.”). Claims 44-46 and 48 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hintermaier, et al. and Gadgil, et al. in further view of U.S. Patent No. 5,382,817 to Kashihara, et al. (“Kashihara, et al.”). Claims 49-52 stand rejected under 35 U.S.C §103(a) as allegedly unpatentable over Hintermaier in view of U.S. Patent No. 6,048,790 to Iacononi, et al. (“Iacononi, et al.”). Claims 53-56 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Hintermaier, et al. and Gadgil, et al. and further in view of U.S. Patent No. 6,067,244 to Ma, et al. (“Ma, et al.”). Applicants traverse the above rejections and submit the following.

The above claims rejected under §103 are dependent on amended Claim 1. If an independent claim is non-obvious under 35 U.S.C. §103(a), then any claim depending therefrom is non-obvious. *In re Fine*, 837F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Applicants submit that the combination of applied references does not render applicants’ claims unpatentable since the applied references do not teach or suggest the use of one of

applicants' claimed precursor compounds, as recited in amended Claim 1. "To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970).

Referring to the §103 rejection of Claims 25-43 and 47, it is the Examiner's position, that it would be obvious to one of ordinary skill in the art at the time of the invention to use the precursor and solvent compositions of Hintermaier, et al. with the process taught by Gadgil, et al., including an intervening pulse of purge gas, in order to form a layer of SBT while avoiding reactions between the precursors.

Hintermaier, et al., as discussed above, do not teach or suggest the use of one of applicants' claimed precursor compounds, as recited in amended Claim 1. Applicants find no motivation in Hintermaier, et al. that would lead one to replace elements of the prior art with one of the presently claimed precursor compounds. Gadgil, et al. do not alleviate the defect in Hintermaier, et al. since the applied secondary fails to teach or suggest the use of one of applicants' claimed precursors. Gadgil, et al. disclose a low profile, compact atomic layer deposition reactor having a low profile body with a substrate processing region adapted to serve a single substrate or a planar array of substrates, and a valved load and unload port for substrate loading and unloading. Applicants submit that Gadgil, et al. is far removed from applicants' claimed invention and find no motivation in Gadgil, et al. that would lead one to replace elements of the prior art with one of the presently claimed precursor compounds. In view of the above amendments and remarks, the rejection to Claims 25-43 and 47 under 35 U.S.C. §103(a) citing the combined disclosures of Hintermaier, et al. and Gadgil, et al. has been obviated.

Claims 44-46 and 48 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Hintermaier, et al. and Gadgil, et al. and further in view of Kashihara, et al.

Hintermaier, et al. and Gadgil, et al., as discussed above, do not teach or suggest the use of one of applicants' claimed precursor compounds, as recited in amended Claim 1. Kashihara, et al. do not alleviate the defects in Hintermaier, et al. and Gadgil, et al., since Kashihara, et al. also fail to teach or suggest applicants' claimed precursor compounds. Kashihara, et al. disclose a semiconductor device including a plug electrode layer 313, a platinum lower electrode 314, a PZT film 315, and an upper electrode 316. Applicants note that the claimed precursor compounds, as recited in amended Claim 1, do not include Pt-containing precursors. Therefore, Kashihara, et al. fail to teach or suggest the use of one of applicants' claimed precursor compounds, as recited in amended Claim 1. In view of the above amendments and remarks, the rejection to Claims 44-46 and 48 under 35 U.S.C. §103(a) citing the combined disclosures of Hintermaier, et al. and Gadgil, et al. and Kashihara, et al. has been obviated.

Claims 49-52 stand rejected under 35 U.S.C §103(a) as allegedly unpatentable over Hintermaier, et al. in view of Iacoponi, et al. Hintermaier, et al., as discussed above, do not teach or suggest the use of one of applicants' claimed precursor compounds, recited in amended Claim 1. Iacoponi, et al. do not alleviate the defect in Hintermaier, et al. since the applied secondary reference calls for using metal organic precursor compounds such as titanium dimethoxy dineodecanoate ($\text{Ti}(\text{OCH}_3)_2(\text{C}_9\text{H}_{19}\text{COO})_2$), tantalum trimethoxy dineodecanoate ($\text{Ta}(\text{OCH}_3)_3(\text{C}_9\text{H}_{19}\text{COO})_2$), and copper dimethoxy diethoxide ($\text{Cu}(\text{OCH}_2)_2(\text{CH}_2\text{OCH}_3)_2$). See Col. 4, lines 32-37 and Col. 6, lines 3-5. Iacoponi, et al. do not teach or suggest the use of one of applicants' claimed precursory compounds as recited in amended Claim 1. Applicants find no motivation in Iacoponi, et al. that would lead one to

replace elements of the prior art with one of the presently claimed elements. Therefore, Iacoponi, et al. fail to teach or suggest applicants' claimed precursor compounds, as recited in amended Claim 1. In view of the above amendments and remarks, the rejection to Claims 49-52 under 35 U.S.C. §103(a) citing the combined disclosures of Hintermaier, et al. and Iacoponi, et al. has been obviated.

Claims 53-56 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Hintermaier, et al. and Gadgil, et al. and further in view of Ma, et al. Hintermaier, et al. and Gadgil, et al., as discussed above, do not teach or suggest the use of one of applicants' claimed precursor compounds. Ma, et al. fail to fulfill the deficiencies of Hintermaier, et al. and Gadgil, et al., since Ma, et al. also fail to teach or suggest applicants' claimed precursor compounds, as recited in amended Claim 1. Applicants note that Ma, et al. is far removed from the applicants' claimed precursor compound and disclose a memory device including an array of memory cells, each of which includes a ferroelectric field effect transistor (FET) as its memory element; and a sense and refresh circuitry connected to the array of memory cells to read stored data within each cell by sensing source-to-drain conductivity of the ferroelectric transistor and to refresh the stored data. Therefore, Ma, et al. fail to teach or suggest the applicants' claimed precursor compounds, as recited in amended Claim 1. In view of the above amendments and remarks, the rejection to Claims 53-56 under 35 U.S.C. §103(a) citing the combined disclosures of Hintermaier, et al., Gadgil, et al. and Ma, et al. has been obviated.

The §103 rejections also fail because there is no motivation in the applied references, which suggests modifying the metal precursor compounds to include applicants' claimed ligands. This rejection is thus improper since the prior art does not suggest this drastic

modification. The law requires that a prior art reference provide some teaching, suggestion, or motivation to make the modification obvious.

Here, there is no motivation provided in the disclosures of the applied prior art reference, or otherwise of record, which would lead one skilled in the art to make the modification mentioned hereinabove. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 972 F.2d, 1260,1266, 23 USPQ 1780,1783-84 (Fed. Cir. 1992).

There is no suggestion in the prior art of applicants' claimed metal precursor compound as recited in amended Claim 1, therefore all the claims of the present application are not obvious from the prior art applied in the present Office Action. Based on the above amendments and remarks, each of the §103 rejection has been obviated; therefore reconsideration and withdrawal of the instant §103 rejections are respectfully requested.

Wherefore, reconsideration and allowance of the claims of the present application, as amended, is respectfully requested.

Respectfully submitted,



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